

DRAFT

Appendix A

Cost of Ownership Calculator Draft

* note. This draft is not the final calculator; it is displayed to show the committee details on figures and calculations. This is an "under-the-hood" view of the calculator.

To be read with **Appendix B** which provides detailed descriptions of each variable.

Overview

This is a draft Cost of Ownership Calculator for state fleet vehicles. State agencies will use the tool when working with DAS to assist them in comparing and selecting vehicles . This draft is in a review stage; it does not reflect the version state fleet managers will see - This spreadsheet allows you to:

1. Learn about the variables and figures OEP suggests for the calculator as well as;
2. Adjust variables to see how they impact the cost of ownership calculation.

The calculator has eight variables. You can change the variables listed in the 'Scenario 1' and 'Scenario 2' cells of the 'Inputs' tab to understand how different variables impact the cost of ownership for a vehicle. You will notice the two scenarios are currently set so that only the ***COST OF CARBON*** variable is different. Please review the attached memo for more detail.

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Input Variables

Read with Appendix B for descriptions and sources for each set of variables

1. Vehicle Description

| variable option | Scenario 1 | Scenario 2 |
|-----------------|---------------|---------------|
| option 1 | 2016 Focus | 2016 Focus |
| option 2 | 2016 Focus EV | 2016 Focus EV |

2. Purchase Price

| variable option | Scenario 1 | Scenario 2 |
|-----------------|------------|------------|
| option 1 | \$15,596 | \$15,596 |
| option 2 | \$25,539 | \$25,539 |

3. Fuel Cost (per unit)

| Variable Option | Scenario 1 | Scenario 2 |
|-------------------------|------------|------------|
| Electric Rate (\$/kWh) | \$0.12520 | \$0.12520 |
| Gasoline Price (\$/gal) | \$2.77 | \$2.77 |

4. Emissions per Unit (MT CO₂e)

| variable option | Scenario 1 | Scenario 2 |
|--------------------------------------|------------|------------|
| Electricity (MTCO ₂ /kWh) | 0.000315 | 0.000315 |
| Gasoline (MTCO ₂ /gallon) | 0.001035 | 0.001035 |

5. Total Lifetime Miles

| variable option | Scenario 1 | Scenario 2 |
|-----------------|------------|------------|
| figure option 1 | 150,000 | 150,000 |

6. Fuel Economy

| variable option | Scenario 1 | Scenario 2 |
|-----------------|------------|------------|
| option 1 | 31 | 31 |
| option 2 | 0.304762 | 0.304762 |

mpg
kwh/mi

7. Maintenance and Repair Costs

| variable option | Scenario 1 | Scenario 2 |
|-----------------|------------|------------|
| option 1 | \$0.052 | \$0.052 |
| option 2 | \$0.030 | \$0.030 |

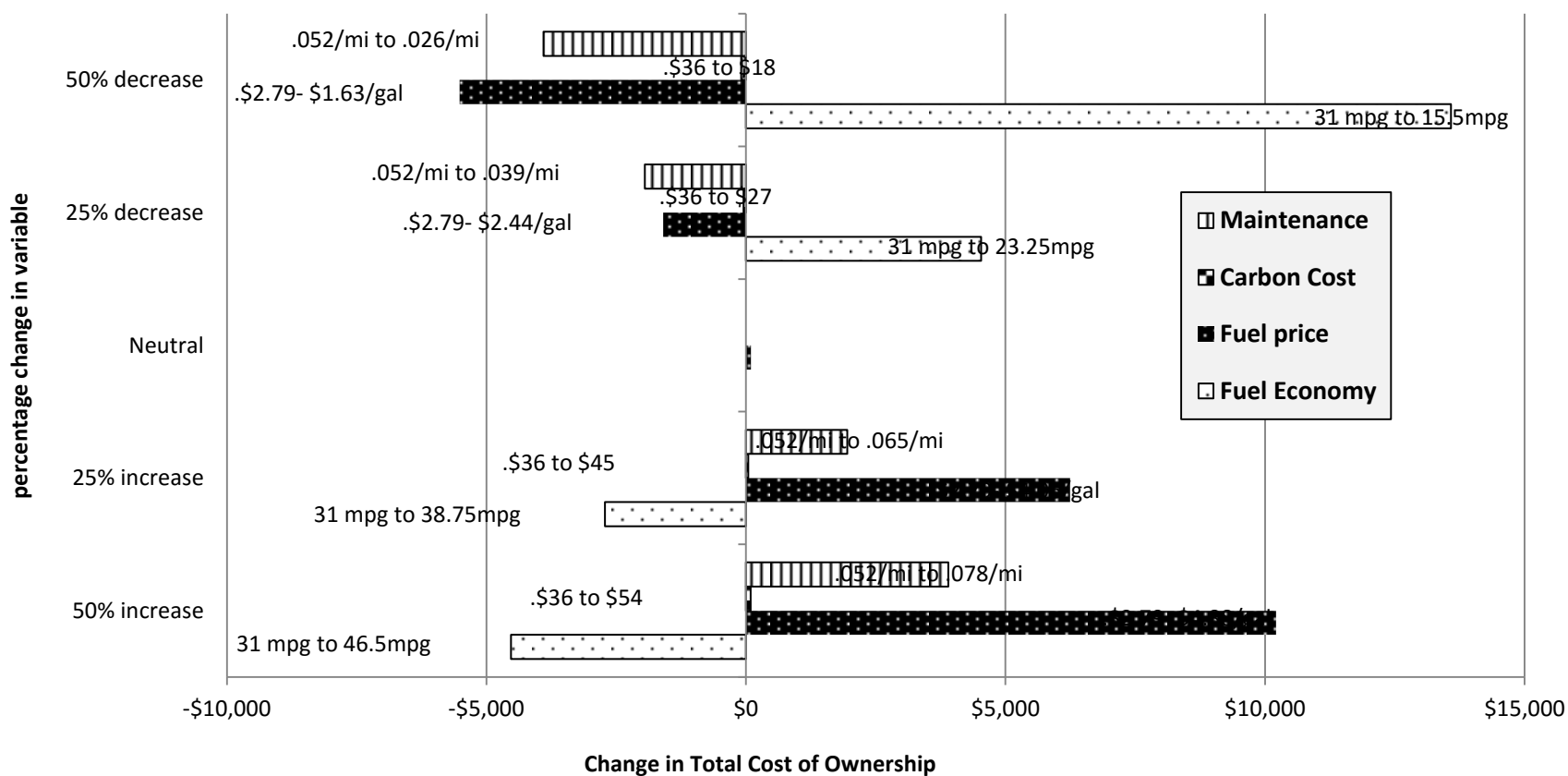
8. Cost of Carbon

| variable option | Scenario 1 | Scenario 2 |
|--------------------------------|------------|------------|
| Cost of Carbon (\$/metric ton) | \$0.00 | \$36.00 |

| Cost of Ownership Calculator Scenario 1 | | | | |
|---|------------------|-----|-------------------|-----|
| Input Variables | | | | |
| | Option 1 | | Option 2 | |
| 1. Vehicle | 2016 Focus | | 2016 Focus EV | |
| 2. Purchase Price | \$15,596 | | \$25,539 | |
| (Fuel Type) (unit) | gasoline (gal) | | electricity (kwh) | |
| 3. Fuel Cost/Unit | \$2.77 | | \$0.13 | |
| 4.Emissions (MT CO ₂ per Unit) | 0.001035 | | 0.000315 | |
| 5.Lifetime Miles Driven | 150,000 | | 150,000 | |
| 6. Fuel Economy (by unit) | 31 | | 0.3048 | |
| 7. Avg. Maintenance and Repair Cost per Mile | \$0.052 | | \$0.030 | |
| 8. Cost of Carbon | \$0.00 | | \$0.00 | |
| Calculations | | | | |
| Fuel Consumption (units) | | | | |
| Total miles driven | 150,000 | | 150,000 | |
| fuel economy(divide or multiply) | 31 mpg | | 0.3048 kwh/mi | |
| Total Fuel Consumption (units) | 4,839 | gal | 45,714 | kwh |
| Total Metric Tons of CO2e | | | | |
| Total Fuel Consumption (unit) | 4,839 | | 45,714 | |
| multiplied by Metric Tons CO2/unit | 0.001035 | | 0.000315 | |
| Total Metric Tons of CO2 | 5.01 | | 14.40 | |
| Total Lifetime Cost of Carbon | | | | |
| Cost of Carbon | \$0 | | \$0 | |
| multiplied byTotal Metric Tons of CO2 | 5.01 | | 14.40 | |
| Total Lifetime Cost of Carbon | \$0.00 | | \$0.00 | |
| Fuel Cost | | | | |
| Total Fuel Consumption | 4,839 | | 45,714 | |
| Fuel Cost/Unit | \$2.77 | | \$0.13 | |
| Total Lifetime Fuel Cost | \$13,403.23 | | \$5,723.43 | |
| Maintenance/Repair Costs | | | | |
| Lifetime Miles Driven | 150,000 | | 150,000 | |
| multiplied by Ave M&R cost per mile | \$0.052 | | \$0.030 | |
| Total Lifetime M&R Cost | \$7,800.00 | | \$4,500.00 | |
| Total Costs | | | | |
| Purchase Price | \$15,596.00 | | \$25,539.00 | |
| plus Total Lifetime Cost of Carbon | \$0.00 | | \$0.00 | |
| plus Total Lifetime Fuel Cost | \$13,403.23 | | \$5,723.43 | |
| plus Total Lifetime M&R Cost | \$7,800.00 | | \$4,500.00 | |
| Total Costs | \$36,799.23 | | \$35,762.43 | |
| Total Cost Difference*: | \$1,037 | | -\$1,037 | |
| INFRASTRUCTURE COSTS/vehicle | included in fuel | | unknown | |
| * Difference in cost between the electric vehicle and the respective gasoline vehicle | | | | |

| Cost of Ownership Calculator Scenario 2 | | | | |
|---|------------------|-----|------------------|--------|
| Input Variables | | | | |
| | Option 1 | | Option 2 | |
| 1. Vehicle | 2016 Focus | | 2016 Focus EV | |
| 2. Purchase Price | \$15,596 | | \$25,539 | |
| (Fuel Type) | gasoline (gal) | | electricity(kwh) | |
| 3. Fuel Cost/Unit | \$2.77 | | \$0.13 | |
| 4.Emissions (MT CO ₂ per Unit) | 0.001035 | | 0.000315 | |
| 5. Lifetime Miles Driven | 150,000 | | 150,000 | |
| 6. Fuel Economy (by unit) | 31 | | 0.3048 | |
| 7. Avg. Maintenance and Repair Cost per Mile | \$0.052 | | \$0.030 | |
| 8. Cost of Carbon | \$36.00 | | \$36.00 | |
| Calculations | | | | |
| Fuel Consumption (units) | | | | |
| Total miles driven | 150,000 | | 150,000 | |
| fuel economy(divide or multiply) | 31 | mpg | 0.3048 | kwh/mi |
| Total Fuel Consumption (units) | 4,839 | gal | 45,714 | kwh |
| Total Metric Tons of CO2e | | | | |
| Total Fuel Consumption (unit) | 4,839 | | 45,714 | |
| multiplied by Metric Tons CO2/unit | 0.001035 | | 0.000315 | |
| Total Metric Tons of CO2 | 5.01 | | 14.40 | |
| Total Lifetime Cost of Carbon | | | | |
| Cost of Carbon | \$36.00 | | \$36.00 | |
| multiplied byTotal Metric Tons of CO2 | 5.01 | | 14.40 | |
| Total Lifetime Cost of Carbon | \$180.27 | | \$518.40 | |
| Fuel Cost | | | | |
| Total Fuel Consumption | 4,839 | | 45,714 | |
| Fuel Cost/Unit | \$2.77 | | \$0.13 | |
| Total Lifetime Fuel Cost | \$13,403.23 | | \$5,723.43 | |
| Maintenance/Repair Costs | | | | |
| Lifetime Miles Driven | 150,000 | | 150,000 | |
| multiplied by Ave M&R cost per mile | \$0.052 | | \$0.030 | |
| Total Lifetime M&R Cost | \$7,800.00 | | \$4,500.00 | |
| Total Costs | | | | |
| Purchase Price | \$15,596.00 | | \$25,539.00 | |
| plus Total Lifetime Cost of Carbon | \$180.27 | | \$518.40 | |
| plus Total Lifetime Fuel Cost | \$13,403.23 | | \$5,723.43 | |
| plus Total Lifetime M&R Cost | \$7,800.00 | | \$4,500.00 | |
| Total Costs | \$36,979.50 | | \$36,280.83 | |
| Total Cost Difference*: | \$699 | | -\$699 | |
| INFRASTRUCTURE COSTS/vehicle | included in fuel | | unknown | |
| * Difference in cost between the electric vehicle and the respective gasoline vehicle | | | | |

Sensitivity Analysis Cost of Ownership Calculator for Gasoline Vehicle



Source: NH OEP Cost of Ownership Calculator Draft 2016